Center Innovation Fund: GSFC CIF

Scotch-Tape Mirror for Hard X-rays

Completed Technology Project (2011 - 2013)

Project Introduction

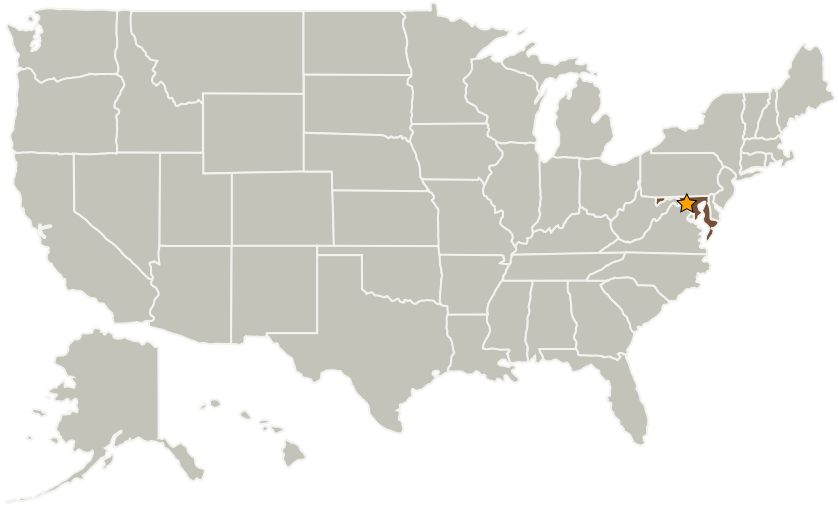
The Scotch-Tape Mirror for Hard X-rays project is to test the possibility of building a grazing incidence mirror for hard X-rays (E>20 keV) using a "scotch-tape" design, in which a thin plastic tape with a specific thickness profile and a multilayer reflective coating is tightly wound into a roll. The goal is to find a low-cost way of building a telescope for hard X-rays with a very large effective area.

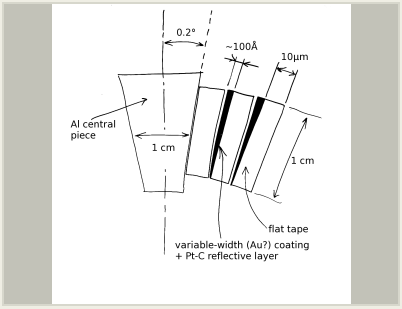
The project is to build a grazing incidence mirror for hard X-rays (E>20 keV) using a "scotch-tape" design, in which a thin plastic tape with a specific thickness profile and a multilayer reflective coating is tightly wound into a roll. Key challenges are (a) to find a suitably smooth tape subatrate (this has been done), (b) to wind a large number of tape shells onto the smooth metal centerpiece without introducing and accummulating shape irregularities, and (c) to give the tape the variable thickness profile in order to achieve the desired optical figure. Our immediate goal is to demonstrate the idea feasibility by building a crude conical X-ray concentrator. If successful, we will aim at building and flying a mirror prototype on a balloon and then proposing for an Explorer mission or MOO. The ultimate goal is a telescope with 1 m^2 effective area at E=30 keV.

Anticipated Benefits

N/A

Primary U.S. Work Locations and Key Partners





Project Image ROE FY12 CIF 353 AP Scotch-Tape Mirror for Hard X-rays

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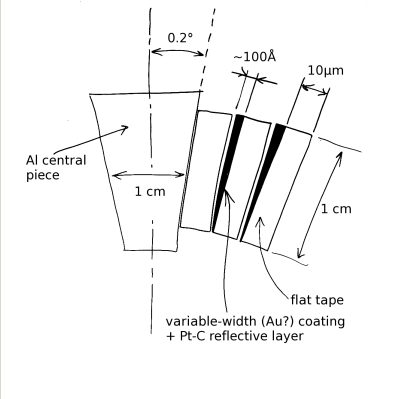
Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Images



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Project Image ROE FY12 CIF 353 AP Scotch-Tape Mirror for Hard X-rays
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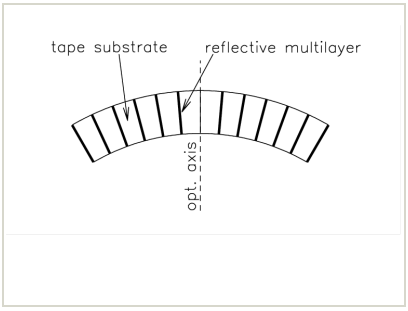

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Project Image ROE FY12 CIF 353 AP Scotch-Tape Mirror for Hard X-rays
(https://techport.nasa.gov/image/1857)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Center / Facility:
Goddard Space Flight Center (GSFC)

Responsible Program:
Center Innovation Fund: GSFC CIF

Project Management

Program Director:
Michael R Lapointe

Program Manager:
Peter M Hughes

Project Manager:
Stanley D Hunter

Principal Investigator:
Maxim L Markevitch

Co-Investigators:
Peter J Serlemitsos
William W Zhang
Takashi Okajima

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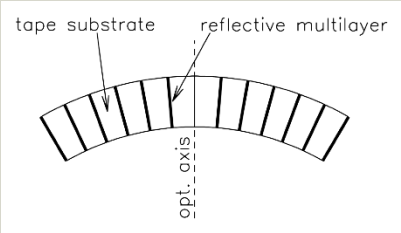

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Project Image ROE FY12 CIF 353
AP Scotch-Tape Mirror for Hard X-rays
(https://techport.nasa.gov/image/1152)

Links

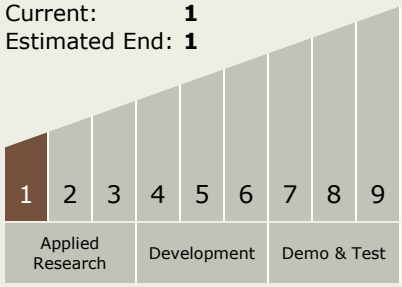
NTR 1
(http://n/a (case number GSC-16590-1, e-NTR number 1339168980))

Project Website:

http://sciences.gsfc.nasa.gov/sed/

Technology Maturity (TRL)

Start: **1**
Current: **1**
Estimated End: **1**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.2 Observatories
    - TX08.2.1 Mirror Systems